

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

1. Work request WCC fills out this section.
☐ Standing Work Permit

Requester: Don Lynch	Date: 7/29/14	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Carter Biggs			Ext.: 7515
Work Control Coordinator: Don Lynch		Start Date: 7/29/14	Est. End Date: 11/1/14
Brief Description of Work: Troubleshooting intermittent water leak and MuTr/MuTrigger electronics in MMS			
Building: 1008	Room: IR	Equipment: MMS	Service Provider: MuTr/MuTrigger experts, CAD & PHENIX techs

2. WCC, Requester/Designee, Service Provider, and ESSH (as necessary) fill out this section or attach analysis

ESSH ANALYSIS							
Radiation Concerns	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Activation	<input type="checkbox"/> Airborne	<input type="checkbox"/> Contamination	<input type="checkbox"/> Radiation	<input type="checkbox"/> NORM	<input type="checkbox"/> Other
<input type="checkbox"/> Special nuclear materials involved, notify Isotope Special Materials Group				<input type="checkbox"/> Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer			
Radiation Generating Devices:	<input type="checkbox"/> Radiography		<input type="checkbox"/> Moisture Density Gauges	<input type="checkbox"/> Soil Density Gauges		<input type="checkbox"/> X-ray Equipment	
Safety and Security Concerns	<input type="checkbox"/> None		<input type="checkbox"/> Explosives	<input type="checkbox"/> Transport of Haz/Rad Material		<input type="checkbox"/> Pressurized Systems	
<input type="checkbox"/> Adding/Removing Walls or Roofs	<input type="checkbox"/> Critical Lift	<input type="checkbox"/> Fumes/Mist/Dust*	<input type="checkbox"/> Magnetic Fields*		<input type="checkbox"/> Railroad Work		
<input type="checkbox"/> Asbestos*	<input type="checkbox"/> Cryogenic	<input type="checkbox"/> Heat/Cold Stress	<input type="checkbox"/> Nanomaterials/particles*		<input checked="" type="checkbox"/> Rigging		
<input type="checkbox"/> Beryllium*	<input type="checkbox"/> Electrical	<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Noise*		<input type="checkbox"/> Silica*		
<input type="checkbox"/> Biohazard*	<input checked="" type="checkbox"/> Elevated Work	<input type="checkbox"/> Lasers*	<input type="checkbox"/> Non-ionizing Radiation*		<input type="checkbox"/> Security Concerns		
<input type="checkbox"/> Chemicals/Corrosives*	<input type="checkbox"/> Excavation	<input type="checkbox"/> Lead*	<input type="checkbox"/> Oxygen Deficiency*		<input type="checkbox"/> Suspect/Counterfeit Items		
<input checked="" type="checkbox"/> Confined Space*	<input type="checkbox"/> Ergonomics*	<input type="checkbox"/> Material Handling	<input type="checkbox"/> Penetrating Fire Walls		<input type="checkbox"/> Vacuum		
Ladder Access Required: <input checked="" type="checkbox"/> Portable Ladder <input type="checkbox"/> Fixed Ladder- Status/Restrictions:							
* Safety Health Rep. Review Required		<input type="checkbox"/> Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM				<input type="checkbox"/> Other	
Environmental Concerns			<input checked="" type="checkbox"/> None		<input type="checkbox"/> Work impacts Environmental Permit No.		
<input type="checkbox"/> Atmospheric Discharges (rad/non-rad/GHG)		<input type="checkbox"/> Land Use Institutional Controls		<input type="checkbox"/> Soil Activation/contamination		<input type="checkbox"/> Waste-Mixed	
<input type="checkbox"/> Chemical or Rad Material Storage or Use		<input type="checkbox"/> Liquid Discharges		<input type="checkbox"/> Waste-Clean		<input type="checkbox"/> Waste-Radioactive	
<input type="checkbox"/> Cesspools (UIC)		<input type="checkbox"/> PCB Management		<input type="checkbox"/> Waste-Hazardous		<input type="checkbox"/> Waste-Regulated Medical	
<input type="checkbox"/> High water/power consumption		<input type="checkbox"/> Spill potential		<input type="checkbox"/> Waste-Industrial		<input type="checkbox"/> Historical Environmental Hazards	
Waste disposition by: <input type="checkbox"/> Other							
Pollution Prevention (P2)/Waste Minimization Opportunity: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				Environmental Preferable Products Available: <input type="checkbox"/> No <input type="checkbox"/> Yes			
FACILITY CONCERNS		<input checked="" type="checkbox"/> None		<input type="checkbox"/> Intermittent Energy Release			
<input type="checkbox"/> Access/Egress Limitations		<input type="checkbox"/> Electrical Noise		<input type="checkbox"/> Potential to Cause a False Alarm		<input type="checkbox"/> Vibrations	
<input type="checkbox"/> Credited Controls (Use USI Process)		<input type="checkbox"/> Impacts Facility Use Agreement		<input type="checkbox"/> Temperature Change		<input type="checkbox"/> Other	
<input type="checkbox"/> Configuration Management		<input type="checkbox"/> Maintenance Work on Ventilation Systems		<input type="checkbox"/> Utility Interruptions			
WORK CONTROLS							
Work Practices							
<input type="checkbox"/> None		<input type="checkbox"/> Exhaust Ventilation		<input checked="" type="checkbox"/> Lockout/Tagout		<input type="checkbox"/> Spill Containment	
<input checked="" type="checkbox"/> Back-up Person/Watch		<input type="checkbox"/> HP Coverage		<input type="checkbox"/> Posting/Warning Signs		<input type="checkbox"/> Time Limitation	
<input type="checkbox"/> Barricades		<input type="checkbox"/> IH Survey		<input checked="" type="checkbox"/> Scaffolding-requires inspection		<input type="checkbox"/> Warning Alarm (i.e. "high level")	
						<input type="checkbox"/> Electrical Inspection Required	
Personal Protective Equipment							
<input type="checkbox"/> None		<input type="checkbox"/> Ear Plugs		<input checked="" type="checkbox"/> Gloves, as necessary		<input type="checkbox"/> Lab Coat	
<input type="checkbox"/> Coveralls		<input type="checkbox"/> Ear Muffs		<input type="checkbox"/> Goggles		<input type="checkbox"/> Respirator*	
<input type="checkbox"/> Disposable Clothing		<input type="checkbox"/> Face Shield		<input type="checkbox"/> Hard Hat		<input checked="" type="checkbox"/> Safety Shoes, as req'd	
						<input type="checkbox"/> High visibility cloths/vest	
						<input type="checkbox"/> Other	
Permits Required (Permits must be valid when job is scheduled.)							
<input type="checkbox"/> None		<input type="checkbox"/> Cutting/Welding		<input type="checkbox"/> Impair Fire Protection Systems			
<input type="checkbox"/> Concrete/Masonry Penetration		<input type="checkbox"/> Digging/Core Drilling		<input type="checkbox"/> Rad Work Permit-RWP No			
<input type="checkbox"/> Confined Space Entry		<input type="checkbox"/> Electrical Working Hot		<input checked="" type="checkbox"/> Other Confined Space 2A certification			
Dosimetry/Monitoring							
<input type="checkbox"/> None		<input type="checkbox"/> Heat Stress Monitor		<input type="checkbox"/> Real Time Monitor		<input type="checkbox"/> TLD	
<input type="checkbox"/> Air Effluent		<input type="checkbox"/> Noise Survey/Dosimeter		<input type="checkbox"/> Self-reading Pencil Dosimeter		<input type="checkbox"/> Waste Characterization	
<input type="checkbox"/> Ground Water		<input type="checkbox"/> O ₂ /Combustible Gas		<input type="checkbox"/> Self-reading Digital Dosimeter		<input type="checkbox"/> Other Check O2 level prior to entry	
<input type="checkbox"/> Liquid Effluent		<input type="checkbox"/> Passive Vapor Monitor		<input type="checkbox"/> Sorbent Tube/Filter Pump			
Training Requirements (List specific training requirements)							
Confined Space, CA-Collider User, PHENIX Awareness, scaffold training, ladder training, working at heights							
Work screening has identified the following as the reason for permitted work:				When work is categorized as worker planned work and a permit is used only the following signatures are required: (Although allowed, there is no need to use back of form)			
<input type="checkbox"/> ESSH				WCC: _____ Date: _____			
<input type="checkbox"/> Complexity				Service Provider: _____ Date: _____			
<input checked="" type="checkbox"/> Work Coordination				Authorization to start: _____ Date: _____			
<input type="checkbox"/> Permit Not Required (Sections 3 through 7 optional)				(Department/Division, or their equivalent, Sup/WCC/Designee)			

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail): See attached work plan and procedure

Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)
None

Notifications to operations and Operational Limits Requirements: None

Post Work Testing, Notification or Documentation Required: See Attached Plan

Job Safety Analysis Required: ☐ Yes ☒ No

Review Done: ☒ in series ☐ team

Reviewed by: * Primary Reviewer signature (not required for Worker Planned Work) means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator	Don Lynch		20146	
Safety Health Representative				
Research Space Manager				
Other				
Other				
Required Walkdown Completed				
*Primary Reviewer				

4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ESSH concerns or on ideas for improved job work flow. Use feedback form or space below.

5. Department/Division, or their equivalent, Line Manager or Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

Name:	Signature:	Life#:	Date:
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6. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.) The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

Name:	Signature:	Life#:	Date:
Comments:			

MMS Entry During Shutdown for MMS Magnet Water leak troubleshooting and MuTr/MuTrigger South Troubleshooting**INTRODUCTION**

CAD and PHENIX mechanical technicians need to access the interior of the Muon Magnet South (MMS) to troubleshoot an intermittent water leak detected during run 14. Muon Tracker Detector (MuTr) and MuTrigger experts may also need to access the interior of the South Muon Magnet to troubleshoot/repair/test MuTr detector subsystem electronics during the 2014 maintenance summer shutdown period after the end of run 13 of the PHENIX. During this period purge gas conditions (inert gases) for subsystems in the MMS will be maintained.

MMS MuTr Troubleshoot, Test and Repair

The following operations will take place the PHENIX 2013 maintenance shutdown periods.

1. For the duration shutdown during which the MMS will be entered as described herein, all PHENIX magnets will be ramped down and locked out.
2. Prior to the first maintenance period for which entry into the MMS is required, The East vertical lampshade shall be removed by C-A technicians. No entry into the MMS shall be permitted until after C-A safety has been contacted to sample the internal atmosphere of the MMS. When C-A safety arrives to take the sample, an access ladder shall be erected to permit sampling and an O₂ content check of the MMS internal atmosphere. The O₂ content shall then be sampled and recorded on a copy of the attached sheet. Each monitoring check shall have its own record sheet.
3. The C-A confined space safety expert shall determine from the tests whether it is safe to enter the MMS for the purposes stated herein. ***In no event shall anyone enter the MMS prior to approval of the C-A confined space monitoring expert.***
4. **During the entire maintenance period in which personnel may be inside the MMS, a 100 cfm blower shall direct external air into the MMS cavity.**
5. After clearance to enter has been approved, properly trained PHENIX technicians and BNL carpenter(s) shall sign the entry log sheet (attached) and may then enter and construct elevated work platforms as described in PHENIX drawing #105-0500-010 (current revision), for the purpose of accessing MuTr and MuTrigger FEE's and detector electronics at elevated areas within the South Muon Magnet (MMS). At any time when any personnel are inside of the MMS an additional watch person shall be stationed outside of the MMS and adjacent to the removed lampshade to monitor the well being of those engaged in work inside. The watch person shall have no other responsibilities during his watch and may not leave his post unless relieved by an equally qualified and dedicated watch person. All work platforms shall be reviewed, inspected and approved by appropriately qualified PHENIX engineering personnel prior to permitting work to be performed on such platforms. At various times during the troubleshooting and repairs, adjustments and changes to the work platforms shall be made to

better access different areas in the MMS. After each such adjustment, an appropriately qualified PHENIX engineer shall review, inspect and approve such platform prior to releasing it for use. All inspections shall be documented on the attached MMS work platform inspection sheet.

Note: at all times the number of persons and the combined weight of persons and equipment shall be below the maximum allowable (2 persons and less than 600 lbs on each platform, 3 persons and less than 900 lbs on all platforms in the MMS). This is in accordance with the design calculations of DRL-ECD-2012-002 rev D.

Additional Note: During erection of the PHENIX MMS scaffolding a one to one ratio between PHENIX technicians and bargaining unit carpenters working on the scaffolding shall be maintained. A copy of the attached agreement between PHENIX and the IBEW (attached) allowing PHENIX Techs to work cooperatively with IBEW carpenters to erect the scaffolding described herein shall be prominently posted at the worksite along with a copy of this work permit.

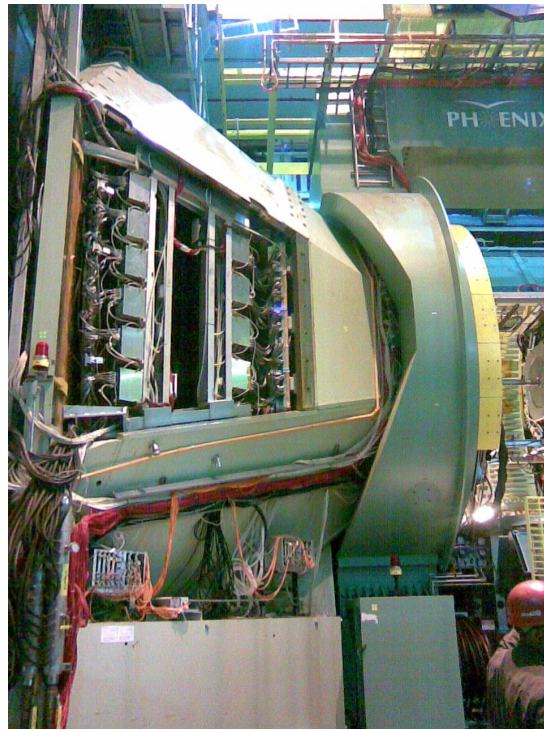
6. After access work platforms have been erected, properly trained MuTr subsystem and MuTrigger FEE experts and/or properly trained CAD and PHENIX technicians shall sign the entry log sheet (attached) and may then enter and perform troubleshooting and operational checks. At any time when any personnel are inside of the MMS an additional watch person shall be stationed outside of the MMS and adjacent to the opened lampshade to monitor the well being of those engaged in work inside. The watch person shall have no other responsibilities during his watch and may not leave his post unless relieved by an equally qualified and dedicated watch person. All those inside the MMS and the watch person shall have current BNL confined safety training and shall comply with all requirements of the BNL Confined Space SBMS standards. As work progresses ***This work permit, the MMS entry log, platform inspection sheet(s) and the Confined Space Entry Certification Form shall be posted near the opened lampshade.***

7. During testing, HV to the MuTr detector panels may turned on and off to trouble shoot faults and test quality of the repair/test connections. Current/voltage limits on MuTr components are within allowable working limits per the PHENIX Awareness Procedure and/or properly shielded from personnel contact and do not require any additional permits.

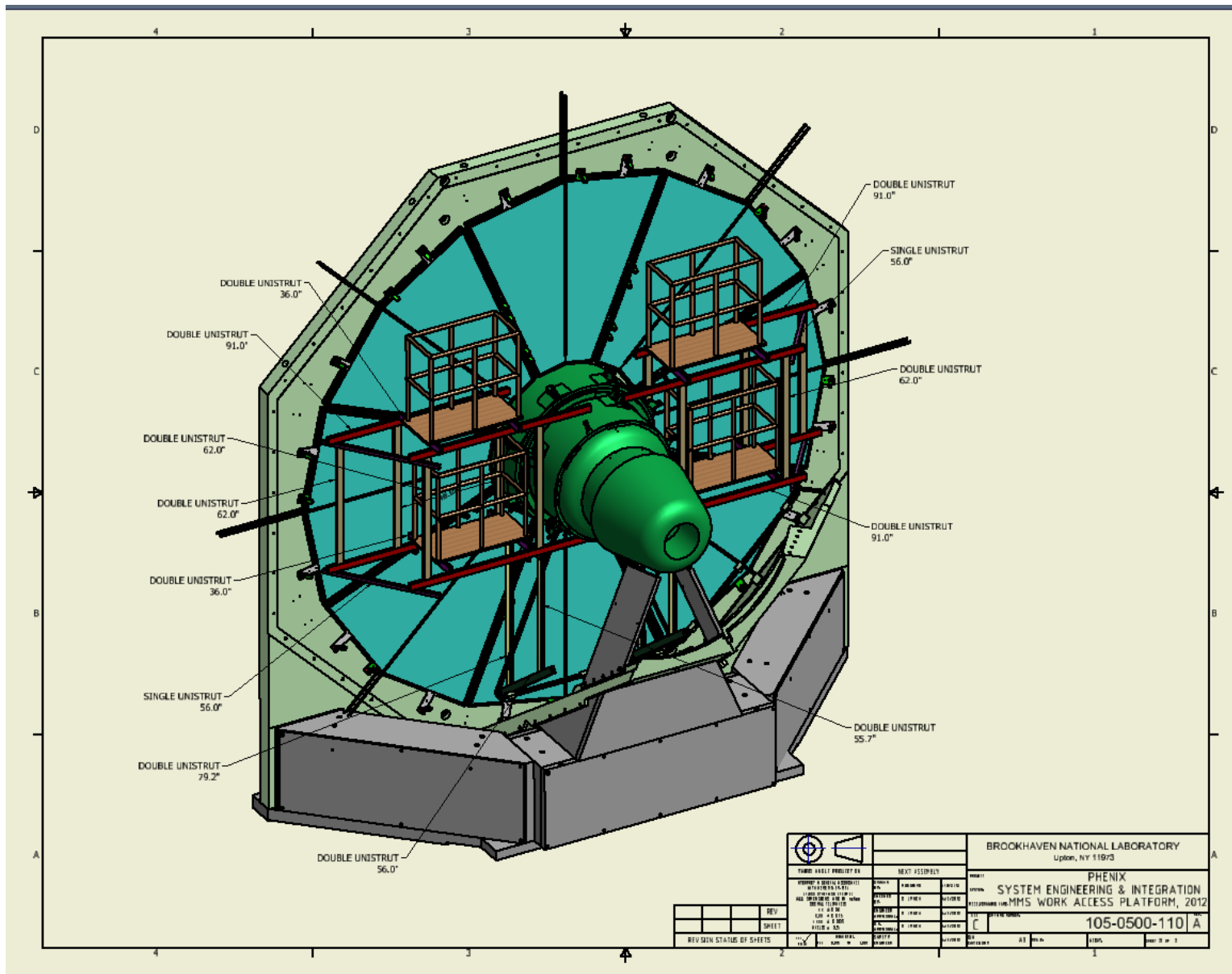
7. After all work has been completed and no additional access to the interior MMS is required for the current maintenance shutdown period all equipment brought into the MMS shall be removed, work platforms dismantled, the MMS east vertical lampshade re-installed, and the MMS lockout removed.

8. After all tasks covered by this work permit have been completed, all equipment brought into the MMS has been removed, the MMS east vertical lampshade re-installed and the MMS lockout removed, this work permit shall be closed and all relevant observations and comments concerning the work performed under this work permit shall be recorded. Should additional subsequent work in the MMS be required, a new work permit shall be generated.

MuTr Stations 2 & 3 South Troubleshooting, Maintenance and Repair During Shutdown 2013



6/17/2013

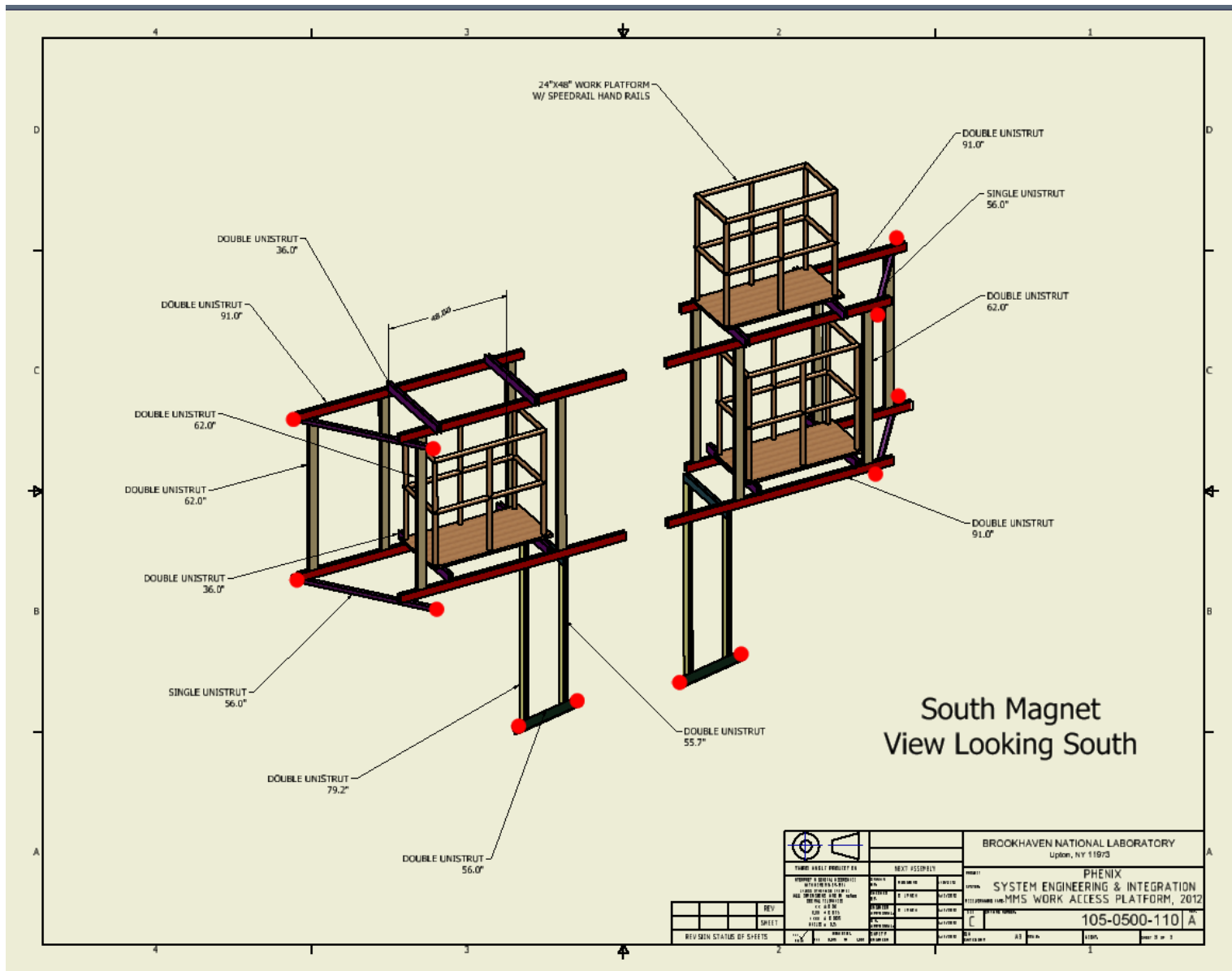


MMS Work Platforms

6/17/2013

PHENIX 2013 Shutdown

Slide # 2



MMS Work Platforms (Magnet not shown for clarity)

6/17/2013

PHENIX 2013 Shutdown

Slide # 3

CONFINED SPACE ENTRY CERTIFICATION

Location Building 1008, IR, Muon Magnet South (MMS)		Date
Department PO	Division PHENIX	
Building 1008	Area/Location/Room: IR, MMS	
Supervisor/Designee Don Lynch/J. Carter Biggs		Life # 20146/15639

PRE-ENTRY QUESTIONS

For each item, check "yes" or "no": If no, consult Supervisor

	YES	NO
Is entry essential to perform work?	<input type="checkbox"/>	<input type="checkbox"/>
Have all personnel been trained in confined space entry?	<input type="checkbox"/>	<input type="checkbox"/>
Are conditions safe to remove utility-hole cover?	<input type="checkbox"/>	<input type="checkbox"/>
Has opening been guarded?	<input type="checkbox"/>	<input type="checkbox"/>
Is monitoring equipment calibrated?	<input type="checkbox"/>	<input type="checkbox"/>
Has monitoring been performed and recorded below?	<input type="checkbox"/>	<input type="checkbox"/>
Is GFCI used, if outside or in wet conditions?	<input type="checkbox"/>	<input type="checkbox"/>
Is ventilation blown into bottom of space? (If required)	<input type="checkbox"/>	<input type="checkbox"/>
Are personnel instructed to evacuate upon hazard detection?	<input type="checkbox"/>	<input type="checkbox"/>
Have all workers reviewed these entry requirements?	<input type="checkbox"/>	<input type="checkbox"/>
Radiation: If present, RWP may be required – review work with ESH Coordinator and RCD personnel. Evaluate hazards and controls.	<input type="checkbox"/> Reviewed	<input type="checkbox"/>

SPACE CLASSIFICATION QUESTIONS

For each item, check box only if "yes"

	Class 2A	Class 2B	Class 2C
Engulfment Hazard Present			<input type="checkbox"/>
Entrapment Hazard Present			<input type="checkbox"/>
Electrical Systems:			
• Deenergized	X		
• Energized and Working Hot			<input type="checkbox"/>
• Energized, but Guarded or not Working Hot	<input type="checkbox"/>		
Mechanical Systems:	n/a		
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized but Guarded or not Working Hot	<input type="checkbox"/>		
Other Energized Systems: (e.g., steam, sewage)	n/a		
• Deenergized	<input type="checkbox"/>		
• Energized and Working Hot			<input type="checkbox"/>
• Energized but Guarded or not Working Hot	<input type="checkbox"/>		
Chemical Hazards inherent in space, based upon monitoring, but controllable by Ventilating - Monitor for O₂ prior to entry	X	<input type="checkbox"/>	
Chemical Hazards inherent in space, based upon monitoring, but not controllable by ventilating	n/a		<input type="checkbox"/>
Chemical Sources, introduced into space? (e.g., welding fumes, solvents)	n/a		<input type="checkbox"/>
High Temperature/Pressure Hazard? (other than steam utility-holes)	n/a		<input type="checkbox"/>

- If ANY box in column 2C is checked, a Confined Space Permit **IS** required.
- If any box in column 2B is checked, and none in column 2C, a Confined Space Permit **IS NOT** required **BUT** continuous monitoring and ventilating **ARE** required.
- If only boxes in column 2A are checked, no additional requirements apply.

Classification evaluation

CLASSIFICATION	<p>CLASS: 2A</p> <p>I have completed the front and back of this Confined Space Entry Certification form and classified this space. If the confined space is classified as a 2C, I will obtain a Confined Space entry permit. If the space is Class 2B, continuous monitoring and ventilation is required and will be documented on this form.</p>	
	Supervisor/Designee:	Life #
	Date:	

BNL CONFINED SPACE ENTRY CERTIFICATION

Meter:	Serial #	Calibration Date:
Day of Use Sensor Check <input type="checkbox"/> Yes <input type="checkbox"/> No		
Tested By:	BNL#:	

MONITORING RESULTS

Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O ₂)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H ₂ S ppm)	Other:
Pre-Entry Certification test					
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	<25 ppm	<10 ppm	

Supplemental sampling record

CLASS 2B CONFINED SPACE ENTRY CERTIFICATION

For Class2B spaces, continuous monitoring is required.

MONITORING RESULTS

Tested By:		BNL Number:			
Date/ Time	Oxygen % (% O ₂)	Flammable Gas (% LEL)	Carbon Monoxide (CO ppm)	Hydrogen Sulfide (H ₂ S ppm)	Other:
Acceptable Reading	19.5 – 23.5 %	< 10 % of LEL	25 ppm	10 ppm	

Class 2B: Describe Method of Ventilation:

Muon Magnet Confined Space Entry Certification Sheet

*The undersigned certify that they have taken the BNL Confined Space Training, BNL Course # **HP-OSH-016**, within the last twenty four months, and understand the hazards involved in working in the south and north muon magnets (**MMS and MMN**).*

[illegible]

Scaffold Safety Checklist

Project & Scaffold:	Job #	WO #:
Date of Inspection: _____ Competent Person(s): _____ Date Scaffold is complete: _____		

[illegible]



date: July 1, 2014

to: E. O'Brien, P. Pizzo

from: Ernest L. Tucker

subject: Scaffolding in support of the PHENIX detector

The staff assigned to the PHENIX Experiment, are required to perform work on the detector. The work will require the installation of scaffolding within the detector as well as outside of it. The following is a summary of the agreement made between the IBEW and PHENIX regarding the installation and removal of the scaffolding in support of the project.

- A PHENIX technician and an IBEW carpenter will cooperate to erect, modify, disassemble and re-erect scaffolding in the station 1 north and south area of the PHENIX IR in close proximity to various PHENIX detector systems and the PHENIX Beryllium beam pipe system, inside the north and south magnets, and between the CM and the DC west detector.
- An IBEW carpenter will be present while PHENIX technician performs work and vice versa. The absence of a carpenter for breaks, lunch, and other short periods will not impede the work of the PHENIX technician as long as an IBEW carpenter is assigned to this project.
- The scaffolding will be modified to change platform elevation several times and will be moved from the North Station 1 to South Station 1 during the project. For each change an IBEW carpenter will be assigned to work with a PHENIX technician. If determined to be necessary, attachment of the scaffolding to the PHENIX decking will be performed by an IBEW carpenter.
- IBEW carpenter will fabricate all custom scaffold parts as needed.
- This agreement will be posted on Job site.

This agreement pertains to the particular job in question and is not in effect for future work nor does it apply to work on other detectors within RHIC. Future activities of this nature will have to be discussed and agreed upon by both parties before work can commence. Please distribute this information to all appropriate personnel.

Regards,

A handwritten signature in blue ink that reads "Ernest L. Tucker". The signature is written in a cursive style and is underlined.

Ernest L. Tucker
Labor Relations Business Partner

cc: D. Allshouse, D. Lynch, D. Tarrant